> hardware then performs a buffer swap. The display image that was just under construction is then transferred to the display screen, and a new image is constructed in the buffer that held the previous display image.

(Engstrom, Col. 1, lines 40-50) (emphasis added). Engstrom, therefore, is limited to using two memory buffers for rendering to a first buffer and scanning out of a second buffer. Further, Engstrom teaches scanning without regard to the memory location as scanning is performed because an entire screen is scanned without interruption.

ENGSTROM DOES NOT DESCRIBE AT LEAST "STORAGE OF THE IMAGE AT THE FIRST MEMORY LOCATION WHEN THE SECOND MEMORY LOCATION INDICATES THE RASTER HAS ACCESSED DATA AT THE FIRST MEMORY LOCATION"

In order for a reference to anticipate a claim, the claim elements described in the reference must be arranged as required by the claim. The Office Action recites Engstrom Col. 21, lines 28-33, col. 6 lines 25-43, col. 22 lines 31-33 and Fig 12 B as teaching "enabling, by a write behind controller, storage of the image at the first memory location when the second memory location indicates the raster has accessed data at the first memory location." However, the cited portions of Engstrom do not teach the claim element arranged as required by the claim. Firstly, Engstrom does not describe storage of the image at the first memory location *when the second memory location indicates the raster has accessed data at the first memory location.* In contrast to the claim, Engstrom as cited teaches:

> Another optimization in the flip control is to read the scan line register, analyze the scan line position relative to the position **when the last flip occurred**. If the scan line is less than the scan line at the time the last flip occurred, then it **is safe to assume** the previous flip operation has completed and the display address has been changed.

(Engstrom, Col. 21, lines 28 – 32) (emphasis added). Firstly, Engstrom is limited to "analyze the scan line position relative to the position **when the last flip occurred**" as opposed to "storage of the image at the first memory location **when the second memory location indicates the raster has accessed data at the first memory location**". Secondly, in contrast to the claims, Engstom assumes that a scan line may be scanned if the scan line is less than the scan line at the time the last flip occurred. Thirdly, storage of the image as recited in the claims occur at a specific condition, namely, "when the second memory location indicates the raster has not

accessed data at the first memory location." Engstrom however, fails to teach this condition because Engstrom makes an assumption that "it is safe to assume the previous flip operation has completed." By way of example, the specification states that the frame buffer is utilized more efficiently "[u]nlike the prior art, which made the determination at the system level based on worst case scenarios." (Specification page 5, lines 11 – 19). Accordingly, Engstrom does not teach ""storage of the image at the first memory location **when the second memory location indicates the raster has accessed data at the first memory location**". Consequently, Engstrom does not teach all the elements of the claims.

Fourthly, Engstrom teaches against "storage of the image at the first memory location when the second memory location indicates the raster has accessed data at the first memory location." Engstrom teaches an opposite approach, namely:

> The display device interface manages access to the front and back buffer. During a flip operation, for example, the back buffer **cannot be modified**.

(Engstrom, Col. 2, lines 52-56) (emphasis added). Since Engstrom teaches that the back buffer cannot be modified, Engstrom teaches against "storage of the image at the first memory location when the second memory location indicates the raster has accessed data at the first memory location."

ENGSTROM DOES NOT DESCRIBE AT LEAST "PREVENTING, BY THE WRITE BEHIND CONTROLLER, STORAGE OF THE IMAGE AT THE FIRST MEMORY LOCATION WHEN THE SECOND MEMORY LOCATION INDICATES THE RASTER HAS NOT ACCESSED DATA AT THE FIRST MEMORY LOCATION"

According to the Office Action, Engstrom at Col. 22, lines 12-30 teaches "preventing, by a write behind controller, storage of the image at the first memory location when the second memory location indicates the raster has not accessed data at the first memory location." However, the cited portions of Engstrom do not teach all the claim elements arranged as required by the claim. In contrast to the claim, Engstrom as cited teaches:

> If the display controller is in the VB period at the current flip request, the flip control has to do more checking. First, it sets the bit indicating that the display controller is in the VB period (466) and then performs a check similar to the one shown in FIG. 10. Specifically, it checks whether a refresh period has elapsed since the last flip request (468, 470). To accomplish this, the flip control gets the

> current time and **compares it with the sum of the last flip request time plus the refresh time.** If a refresh time has elapsed, it is safe to update the display address. If not, the flip control returns the 'WasStillDrawing' error.

(Engstrom Col. 22, lines 8 – 18. (emphasis added).

Firstly, Engstrom teaches that "the flip control gets the current time and compares it with the sum of the last flip request time plus the refresh time" rather than "when the second memory location indicates the raster has not accessed data at the first memory location" as claimed. Secondly, Engstrom teaches that the "was still drawing" error be asserted if the refresh time has not elapsed. Instead, the claims recite "preventing...storage... when the second memory location indicates the raster has not accessed data at the first memory location." Thirdly, Engstrom teaches against the claims because Engstrom teaches "If the current position of the scan line is below the previous position, **then the scan line test is inconclusive**...." (Engstrom Col. 22, lines 27 – 30 (emphasis added). By contrast, the claims teach a conclusive operation, namely "preventing, by the write behind controller, storage of the image at the first memory location *when* the second memory location indicates the raster has not accessed data at the first memory location." Accordingly, Engstrom, as cited in the Office Action teaches against the claim. As a result, Engstrom teaches against "preventing, by the write behind controller, storage of the image at the first memory location when the second memory location indicates the raster has not accessed data at the first memory location."

ENGSTROM DOES NOT DESCRIBE AT LEAST "THE RASTER HAS ACCESSED DATA AT THE FIRST MEMORY LOCATION" AND "A SECOND MEMORY LOCATION REPRESENTATIVE OF A RASTER LOCATION"

Engstrom teaches and requires using a surface based flipping operation as opposed to a "raster location" based write control operation. For example, Engstrom teaches:

> In the case of flipping, the way in which the interface manages access to surface memory can be classified into two classes: 1) where the [f]lipping structure represents an **on screen** (visible on monitor) **surface** such as the primary surface or a visible overlay surface, and 2) an off screen surface.

(Engstrom, Col. 19, lines 21-26) (emphasis added). Accordingly, Engstrom teaches flipping a structure (i.e. an object, a window ...) representing an on screen surface rather than a raster location. For example, Engstrom teaches "To achieve smooth animation, the application

renders its next **display frame** to the back buffer." In contrast to Engstrom rendering a display frame into the back buffer, Applicants claim a raster location directly accessed by a raster. In further contrast to the claims, Engstrom requires at least two buffers; a front buffer and a back buffer, and the flipping structure flips an entire display image, such as a frame, whereas the claims are not restricted to two buffers and a raster location controls the rendering function . (Engstrom, Col. 15, lines 38-40).

The Engstrom operation appears to be similar to the prior art system described in Applicants' Background of the Invention section. In one example described in the specification, where a large triangle is to be issued for rendering, and only a small portion of the triangle is below the line currently being rastered, the prior art (such as Engstrom) operation can result in the display engine indicating the frame buffer is not ready. Therefore, a dispatch of the operation can be stalled even though the rendering engine could be doing useful work on most of the triangle. (See, for example, Specification, page 2, lines 22-30). For at least the reasons provided above these claims are not anticipated by Engstrom. Accordingly, these claims are believed to be in condition for allowance.

As to Claim 2, Applicants respectfully submit that this claim adds additional novel subject matter and is also allowable at least as depending from an allowable base claim.

As for Claims 6 and 7, Col. 7, lines. 17-25 of Engstrom have been cited. Since Claims 6 and 7 depend from Claim 1, Applicants respectfully reassert the relevant remarks made with respect to Claim 1. Further, the back buffer described in this section of Engstrom does not appear to be the frame buffer (the primary surface structure) and as such for at least these reasons these claims are not anticipated.

As to Claims 8 and 9, the Office Action cites Col. 4, lines 59-62 of Engstrom. However, these cited lines of Engstrom merely indicate that a 2D or 3D graphics engine is the display hardware. Applicants respectfully submit that the cited portion does not describe how graphics primitives are provided to the graphics engine when the rendering engine is storing data to a frame buffer wherein the frame buffer is being accessed by a display device controller that is providing a current image. The claim further requires that the display device controller is at a point where it has not yet accessed an address location having data associated with a current

image wherein that location is between the first two address locations such that the graphics primitive is provided to the rendering engine at this point. Typically, as previously stated with respect to prior art systems, the graphics primitive would not be submitted to a rendering engine at this point in time. Accordingly, this claim for at least these reasons is also believed to be in condition for allowance.

Claims 11, 12 and 17-20 stand rejected based on the same rationale for Claim 1. Applicants respectfully reassert at least the relevant remarks made above with respect to Claim 1. Accordingly, these claims are also believed to be in condition for allowance.

Claim 10s stand rejected under 35 U.S.C. § 103(a) based on Engstrom in view of official notice. Pursuant to M.P.E.P. 2144.03, Applicant respectfully challenges the assertion that all elements as arranged are inherently expressed, and requests that supporting reference be cited for each and every claim element if the rejection is maintained. Applicants respectfully submit that this claim adds additional novel subject matter and is also allowable at least as depending upon an allowable base claim.

Applicants respectfully submit that the claims are in condition for allowance, and an early Notice of Allowance is earnestly solicited. The Examiner is invited to telephone the below-listed attorney at 312-609-7970 if the Examiner believes that a telephone conference will expedite the prosecution of the application.

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Respectfully submitted,

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